I claim:

1. An image controller for at least in part controlling an image generation machine, said image generation machine for controlling imagery shown by a display;

said image controller comprising,

a member graspable by a human user's hand;

a first button, said first button at least in part exposed exterior of said member to be depressible by a finger of a hand grasping said member, said first button structured to rotate upon depression by a finger,

a first proportional sensor, said first proportional sensor mounted within said member and activatable by rotation of said first button;

a second button, said second button at least in part exposed exterior of said member to be depressible by a finger of a hand grasping said member, said second button structured to rotate upon depression by a finger,

a second proportional sensor, said second proportional sensor mounted within said member and activatable by rotation of said second button;

the first and second buttons are variably depressible, and the first and second proportional sensors are structured to vary electrical output related to variable depression of the associated buttons, said output communicated to

the image generation machine causing imagery shown by the display to be variably controlled through variable depression of the first and second buttons;

a two-axes input structure at least in part supported by said member, said two-axes input structure associated with sensors for sensing two axes of inputs;

the first and second proportional sensors are at least in part connected to a sheet;

the sensors associated with said two-axes input structure are at least in part connected to said sheet;

active tactile feedback means for providing feedback to a hand grasping said member, said active tactile feedback means

is positioned within said member.

2. An image controller according to claim 1 further comprising

a third proportional sensor is pressure-sensitive and includes a resilient dome cap, and

a fourth proportional sensor is pressure-sensitive and includes a resilient dome cap;

the resilient dome caps of the third and the fourth proportional sensors are each structured to provide a break-over tactile feedback.

3. An image controller according to claim 2 further comprising the resilient dome caps of the third and the fourth proportional sensors are each structured with a portion to impinge against an underlying electrically conductive element, said electrically conductive element at least engaging circuit traces when impinged upon.

4. An image controller according to claim 3 further comprising the portions of the resilient dome caps of the third and fourth proportional sensors, the portions which impinge against the underlying electrically conductive elements, are substantially convexed shaped portions.

5. An image controller according to claim 4 further comprising

said circuit traces supported on said sheet.

6. An image controller according to claim 5 further comprising

said active tactile feedback means includes a motor.

7. An image controller according to claim 6 further comprising

an offset weight mounted on a shaft of said motor.

8. An image controller according to claim 7 wherein said controller is a hand held three-dimensional graphics controller.

9. An image controller according to claim 1 wherein the sensors associated with said two-axes input structure are two bi-directional sensors.

10. An image controller according to claim 1 wherein the sensors associated with said two-axes input structure are four uni-directional sensors.

11. An image controller according to claim 10 wherein said two-axes input structure includes four resilient dome caps.

12. An image controller for at least in part controlling an image generation machine, said image generation machine for controlling imagery;

said image controller comprising,

a member graspable by a human user's hand;

a first pivotally mounted button, said first pivotally mounted button at least in part exposed exterior of said member to be depressible by a finger of a hand grasping said member,

a first proportional sensor, said first proportional sensor mounted within said member and activatable by depression of said first pivotally mounted button;

said first pivotally mounted button is variably depressible, and said first proportional sensor is structured to vary electrical output related to variable depression of the pivotally mounted button, said output communicated to

the image generation machine causing imagery to be variably controlled through variable depression of said first pivotally mounted button;

active tactile feedback means for providing feedback to a

hand grasping said member, said active tactile feedback means is positioned within said member.

13. An image controller according to claim 12 further comprising

a second pivotally mounted button, said second pivotally mounted button at least in part exposed exterior of said member to be depressible by a finger of a hand grasping said member,

a second proportional sensor, said second proportional sensor mounted within said member and activatable by depression of said second pivotally mounted button;

said second pivotally mounted button is variably depressible, and said second proportional sensor is structured to vary electrical output related to variable depression of the second pivotally mounted button, said output communicated to

the image generation machine causing imagery to be variably controlled through variable depression of said second pivotally mounted button.

14. An image controller according to claim 13 further comprising

a two-axes input structure at least in part supported by said member, said two-axes input structure associated with sensors for sensing two axes of inputs.

15. An image controller according to claim 14 further comprising

the first and second proportional sensors are at least in part connected to a sheet.

16. An image controller according to claim 15 further comprising

the sensors associated with said two-axes input structure are at least in part connected to said sheet.

17. An image controller according to claim 16 further comprising

a third proportional sensor activated by a single-finger depressible individual button, and

a fourth proportional sensor activated by a single-finger depressible individual button.

18. An image controller according to claim 17 further comprising

said third proportional sensor is pressure-sensitive and includes a resilient dome cap, and

said fourth proportional sensor is pressure-sensitive and includes a resilient dome cap.

19. An image controller according to claim 18 further comprising the resilient dome caps of the third and the fourth proportional sensors are each structured to provide a break-over tactile feedback.

20. An image controller according to claim 19 further comprising the resilient dome caps of the third and the fourth proportional sensors are each structured with a portion to impinge against an underlying electrically conductive element, said electrically conductive element at least engaging circuit traces when impinged upon.

21. An image controller according to claim 20 further comprising the portions, of the resilient dome caps which impinge against the underlying electrically conductive elements, are substantially convexed shaped portions.

22. An image controller according to claim 21 further comprising

said circuit traces supported on said sheet.

23. An image controller according to claim 22 further comprising

said active tactile feedback means includes a motor.

24. An image controller according to claim 23 further comprising

an offset weight mounted on a shaft of said motor.

25. An image controller according to claim 24 wherein said controller is a hand held three-dimensional graphics controller.

26. A hand operable image controller for controlling imagery, comprising:

a housing;

a first two-axes input structure supported by said housing;

a second two-axes input structure supported by said housing;

active tactile feedback means for providing a feedback to a human user of said controller, said active tactile feedback means supported by said housing.

27. A hand operable image controller according to claim 26 wherein said active tactile feedback means includes a motor having a shaft with an offset weight mounted on said shaft.

28. A hand operable image controller according to claim 27 wherein

said first two-axes input structure is associated with sensors for interpreting two-axes of input, and

said second two-axes input structure is associated with sensors for interpreting two-axes of input, and

a sheet connects the sensors of the first and second two-axes input structures.

29. A hand operable image controller according to claim 26 wherein said housing supports a single-finger depressible independent button.

30. A hand operable image controller according to claim 29 wherein said button is associated with a proportional sensor, and said button is variably depressible causing said proportional sensor to create a signal representing the variable depression of said button, said signal causing said imagery to vary according to the variable depression of said button.

31. A hand operable image controller according to claim 30 wherein said controller includes means for providing a threshold tactile feedback associated with depression of said button.

32. A hand operable image controller according to claim 31 further comprising

a resilient dome cap associated with said proportional sensor,

said proportional sensor is a pressure-sensitive sensor.

33. A hand operable image controller according to claim 32 wherein said pressure-sensitive sensor is a variable resistance sensor.

34. A hand operable image controller according to claim 33 wherein said resilient dome cap contains a generally convexed surface area located within the dome.

35. A hand operable image controller according to claim 34 wherein said convexed surface is deformable and flattens under depressive pressure applied to said button.

36. A hand operable image controller according to claim 30 wherein said button is pivotally mounted.

37. A hand operable image controller according to claim 36 wherein the proportional sensor associated with the pivotally mounted button is a rotary sensor.

38. A hand operable image controller according to claim 37 wherein said rotary sensor is a potentiometer.

39. A hand operable image controller according to claim 30 wherein

said first two-axes input structure is associated with sensors for interpreting two-axes of input, and

said second two-axes input structure is associated with sensors for interpreting two-axes of input, and

a sheet connects the sensors of the first and second two-axes input structures, and said sheet also connects

said proportional sensor of said single-finger depressible independent button.

40. A hand operable image controller according to claim 39 wherein said sheet is a circuit board sheet.

41. A hand operable image controller according to claim 39 wherein said sheet is a flexible membrane sheet.

42. A hand operable image controller according to claim 33 wherein

said first two-axes input structure is associated with sensors for interpreting two-axes of input, and

said second two-axes input structure is associated with sensors for interpreting two-axes of input, and

a sheet connects the sensors of the first and second two-axes input structures, and said sheet also connects

said pressure-sensitive sensor of said button.

43. A hand operable image controller according to claim 42 wherein said sheet is a circuit board sheet.

44. A hand operable image controller according to claim 42 wherein said sheet is a flexible membrane sheet.

45. A hand operable image controller according to claim 37 wherein

said first two-axes input structure is associated with sensors for interpreting two-axes of input, and

said second two-axes input structure is associated with sensors for interpreting two-axes of input, and

a sheet connects the sensors of the first and second two-axes input structures, and said sheet connects

said rotary sensor of the pivotally mounted button.

46. A hand operable image controller according to claim 45 wherein said sheet is a circuit board sheet.

47. A hand operable image controller according to claim 45 wherein said sheet is a flexible membrane sheet.

48. A method of controlling imagery comprising the steps of:

depressing, variably, a finger depressible button, said button

pivoting, variably, causing variable

activating of a proportional sensor, said proportional sensor

outputting a signal useful to an image generation machine for

causing imagery to vary according to the variable depressing of said button.

49. A method of controlling imagery according to claim 48 further comprising the steps of:

depressing, variably, a second finger depressible button, the second button

pivoting, variably, causing variable

activating of a second proportional sensor, said second proportional sensor

outputting a second signal useful to the image generation machine for causing imagery to vary according to the variable depressing of said second button.

50. A method of controlling imagery according to claim 49 further comprising the step of:

providing an active tactile feedback.

51. A method of controlling imagery according to claim 50 further comprising the step of:

operating, variably, a two-axes input structure associated with proportional sensors for variably controlling said imagery.

52. A method of controlling imagery according to claim 51 further comprising the step of:

operating, variably, a second two-axes input structure associated with proportional sensors for variably controlling said imagery.

53. A method of controlling imagery according to claim 52 further comprising the step of:

depressing, variably, a third finger depressible button for variably controlling said imagery.

54. A method of controlling imagery according to claim 52 further comprising the step of:

operating a third two-axes input structure.

55. A method of controlling imagery according to claim 54 further comprising the step of:

depressing, variably, a third finger depressible button for variably controlling said imagery.

56. A method of navigating a viewpoint within a three-dimensional graphics display, comprising the steps of:

variably depressing a pivotal button, said pivotal button

activating a proportional sensor, said proportional sensor

outputting a signal at least in part useful for variably navigating the viewpoint.

57. A method of navigating a viewpoint according to claim 56 further including the step of

supplying active tactile feedback.

58. A method of navigating a viewpoint according to claim 57 further including the steps of:

variably depressing a second pivotal button, said second pivotal button

activating a second proportional sensor, said second proportional sensor

outputting a second signal at least in part useful for variably navigating the viewpoint.

59. A method of navigating a viewpoint according to claim 58 further including the step of:

operating, variably, a two-axes input structure for variably navigating the viewpoint.

60. A method of navigating a viewpoint according to claim 59 further including the step of:

operating, variably, a second two-axes input structure for variably navigating the viewpoint.

61. A method of navigating a viewpoint according to claim 60 further including the step of:

depressing with varying pressure, a single-finger depressible button associated with a pressure-sensitive sensor and a resilient dome cap having a substantially convexed portion for impinging electrically conductive material.

62. A method of navigating a viewpoint according to claim 60 further including the step of:

operating, variably, a third two-axes input structure for variably navigating the viewpoint.

63. A method of navigating a viewpoint according to claim 62 further including the step of:

depressing with varying pressure, a single-finger depressible button associated with a pressure-sensitive sensor and a resilient dome cap having a substantially convexed portion for impinging electrically conductive material.

64. A method of controlling an object shown by a three-dimensional graphics display, comprising the steps of:

variably depressing a pivotal button, said pivotal button activating a proportional sensor, said proportional sensor outputting a signal at least in part useful for variably controlling the object.

65. A method of controlling an object according to claim 64 further including the step of

receiving active tactile feedback.

66. A method of controlling an object according to claim 65 further including the steps of:

variably depressing a second pivotal button, said second pivotal button

activating a second proportional sensor, said second proportional sensor

outputting a second signal at least in part useful for variably controlling the object.

67. A method of controlling an object according to claim 66 further including the step of:

operating, variably, a two-axes input structure for variably controlling the object.

68. A method of controlling an object according to claim 67 further including the step of:

operating, variably, a second two-axes input structure for variably controlling the object.

69. A method of controlling an object according to claim 68 further including the step of:

depressing with varying pressure, a single-finger depressible button associated with a pressure-sensitive sensor and a resilient dome cap having a substantially convexed portion for impinging electrically conductive material, said depressing with varying pressure for variably controlling the object.

70. A method of controlling an object according to claim 68 further including the step of:

operating, variably, a third two-axes input structure for variably controlling the object.

71. A method of controlling an object according to claim 70 further including the step of:

depressing with varying pressure, a single-finger depressible button associated with a pressure-sensitive sensor and a resilient dome cap having a substantially convexed portion for impinging electrically conductive material, said depressing with varying pressure for variably controlling the object.

72. A method of controlling imagery, comprising the steps of:

pressing, variably, a first button for varying the imagery,

receiving a first break-over tactile feedback.

73. A method of controlling imagery according to claim 72 wherein said receiving of said first break-over tactile feedback is preceded by the variable pressing of said first button.

74. A method of controlling imagery according to claim 72 further comprising the steps of:

pressing, variably, a second button for varying the imagery,

receiving a second break-over tactile feedback.

75. A method of controlling imagery according to claim 74 wherein said receiving of said second break-over tactile feedback is preceded by the variable pressing of said second button.

76. A method of controlling imagery according to claim 74 further comprising the step of:

inputting variably, two-axes inputs using a first two-axes structure, said inputting variably for varying the imagery.

77. A method of controlling imagery according to claim 76 further comprising the step of:

inputting variably, two-axes inputs using a second two-axes structure, for varying the imagery.

78. A method of controlling imagery according to claim 77 further comprising the step of:

depressing with varying pressure a single-finger depressible button for varying the imagery.

79. A method of controlling imagery according to claim 77 further comprising the step of:

inputting two-axes inputs using a third two-axes structure, for controlling the imagery.

80. A method of controlling imagery according to claim 79 further comprising the step of:

depressing with varying pressure a single-finger depressible button for varying the imagery.

81. A method of controlling imagery by controlling variable output of at least one variable output sensor actuated by a single finger depressible button, comprising the steps:

pressing, variably, said button, thus

actuating said sensor, said sensor

outputting a signal, said signal representing intensity of the pressing,

varying the imagery according to said signal,

providing, at least through said button, a break-over tactile feedback.

82. A method of controlling imagery according to claim 81 wherein a second variable output sensor is actuated by a second single finger depressible button, further comprising the steps:

pressing, variably, said second button, thus

actuating said second sensor, said second sensor

outputting a second signal, said second signal representing intensity of the pressing of said second button,

varying the imagery according to said second signal,

providing at least through said second button a second break-over tactile feedback.

83. A method of controlling imagery according to claim 82 further comprising the step of:

providing an active tactile feedback.

84. A method of controlling imagery according to claim 83 further comprising the step of:

operating a first two-axes input structure for varying the imagery.

85. A method of controlling imagery according to claim 84 further comprising the step of:

operating a second two-axes input structure for varying the imagery.

86. A method of controlling imagery according to claim 85 further comprising the step of:

depressing with varying pressure a third finger depressible button causing varying change of said imagery.

87. A method of controlling imagery according to claim 85 further comprising the step of:

operating a third two-axes input structure for controlling the imagery.

88. A method of controlling imagery according to claim 87 further comprising the step of:

depressing with varying pressure a fourth finger depressible button causing varying change of said imagery.

89. A method of manufacturing a hand operable image controller for controlling imagery, comprising the steps of:

installing a pivotally moveable button as a part of said image controller, and

installing a proportional sensor positioned to be activated by pivoting motion of said pivotally moveable button, and

installing circuitry for reading said proportional sensor and causing the imagery to change variably according to said pivoting motion of said pivotal button.

90. A method of manufacturing a hand operable image controller according to claim 89 further comprising the steps of:

installing a first two-axes input structure as part of said controller,

installing active tactile feedback means.

91. A method of manufacturing a hand operable image controller according to claim 90, further comprising the steps of:

installing a second pivotally moveable button as part of said image controller, and

installing a second proportional sensor positioned to be activated by pivoting motion of said second pivotally moveable button, and

installing a second two-axes input structure as part of said controller.

92. A method of manufacturing a hand operable image controller according to claim 91, further comprising the step of:

installing a third two-axes input structure as part of said controller.

93. A method of manufacturing a hand operable image controller according to claim 92, further comprising the step of:

installing a pressure-sensitive button for variably controlling imagery in relation to pressure applied to said pressure-sensitive button.

94. A method of manufacturing a hand operable image controller according to claim 93, further comprising the step of:

installing a sheet, said sheet supporting electrical circuit traces and said sheet connecting the proportional

sensors with sensors associated with said first two-axes input structure and with a pressure-sensitive sensor associated with said pressure-sensitive button.

95. A method of manufacturing a hand operable image controller for at least in part controlling an image generation machine, said image generation machine for controlling imagery shown by a display; the method comprising the steps of:

molding a housing graspable by a human user's hand;

installing a first button positioned at least in part exposed exterior of said housing to be variably depressible by a finger of a hand grasping said housing, said first button structured to rotate upon depression by a finger,

installing a first proportional sensor, said first proportional sensor mounted within said housing and activatable by rotation of said first button;

installing a second button positioned at least in part exposed exterior of said housing to be variably depressible by a finger of a hand grasping said housing, said second button structured to rotate upon depression by a finger,

installing a second proportional sensor, said second proportional sensor mounted within said housing and activatable by rotation of said second button;

installing circuitry for reading the first and second proportional sensors, said circuitry for creating an electrical output related to variable depression of the associated buttons, and for communicating said output to the image generation machine causing imagery shown by the display to be variably controlled through variable depression of the first and second buttons;

installing a two-axes input structure at least in part supported by said housing, said two-axes input structure associated with sensors for sensing two axes of inputs;

installing a sheet at least in part supporting said circuitry, said sheet connecting the first and second

proportional sensors, said sheet also connecting the sensors associated with said two-axes input structure;

installing a motor and weight for providing feedback to a hand grasping said housing, said motor is positioned within said housing.

96. A method of manufacturing a hand operable image controller according to claim 95 further including the steps:

installing a third proportional sensor to be activated by human input, and

installing a fourth proportional sensor to be activated by human input;

said third proportional sensor is pressure-sensitive and includes a resilient dome cap, and

said fourth proportional sensor is pressure-sensitive and includes a resilient dome cap;

the resilient dome caps of the third and the fourth proportional sensors are each structured to provide a break-over tactile feedback.